

- spending by foreigners on exports minus spending on imports. This is known as net exports ( $X-M$ ).

The expenditure method measures the value of the arrow marked as number (4) in Figure 13.1.

Each approach measures the value of a nation's output differently by looking at different sets of data. Nonetheless, since they are measuring the same thing, their values are necessarily an equal amount. One common and highly acceptable definition of GDP is that it is the total value of all final goods and services produced in an economy in a year. This clearly reflects the output method of calculation. Another widely used definition is that GDP is the total value of all spending in the economy, algebraically expressed as  $GDP = C + I + G + (X-M)$ . This reflects the expenditure method. Thus, regardless of the method chosen, in theory, accounting will result in the same final figure, whether we call it national output, national income, or national expenditure.

In practice, however, the data that are collected to calculate each of the three values come from many different and varied sources, and inevitably there will be inaccuracies in the data, leading to imbalances among the final values. Some of these inaccuracies are the result of the timing of the data gathering; often figures have to be revised at later dates when full information is collected.

### Student workpoint 13.1

- 1 Using the expenditure approach, calculate the GDP of Canada in 2009 using the data below.

	(million CAD\$)
Consumer expenditure on goods and services	1 527 258
Business investment	269 394
Government expenditure	333 942
Exports	438 553
Imports	464 722

Source: Statistics Canada, [www40.statcan.ca](http://www40.statcan.ca)

- 2 What percentage of GDP is made up by each of the **four** sectors of the economy?
- 3 Why don't economists simply ignore the imports figure, instead of actually deducting it, when calculating GDP?

### Gross domestic product (GDP) and gross national product (GNP)/gross national income (GNI)

Two definitions for gross domestic product (GDP) were given above. A third is useful to be able to make a comparison between GDP and gross national product (GNP)/gross national income (GNI). GDP may be defined as the total of all economic activity in a country, regardless of who owns the productive assets. For example, if an Indian multinational company (MNC)

is operating in Canada and earning profits, then this income is included in the Canadian GDP and not in the Indian GDP. If the production takes place on Canadian land then it is recorded on the Canadian GDP.

Gross national product (GNP)/gross national income (GNI) is the total income that is earned by a country's factors of production regardless of where the assets are located.

In the example above, the profits earned by the Indian MNC would be included in Canada's GDP but not Canada's GNI because Canada does not own the assets. Similarly, Canada's GDP would not include profits earned by a Canadian MNC operating in Brazil but its GNI would include such profits. Thus, GNI is equal to GDP plus income earned from assets abroad minus income paid to foreign assets operating domestically. The income earned by assets held in foreign countries is known as property income from abroad and the difference between income earned from assets abroad minus income paid to foreign assets operating domestically is known as net property income from abroad.

$$GNI = GDP + \text{net property income from abroad}$$

### Gross national income (GNI) and net national income (NNI)

Throughout the course of a year a country's capital stock will lose some of its value. This is known as depreciation of capital or capital consumption. This is due to several factors. It may simply be due to wear and tear as machinery is used, there may be damage to capital equipment, or technology might make machinery obsolete. In effect, capital gets "used up" and the GDP does not take into account this depreciation of capital. The measure that does take this into account is called net national income (NNI), which is simply gross national income minus depreciation (capital consumption). While NNI gives a more realistic view of the real economic activity of a country, in practice it is very difficult to account for depreciation. Thus gross figures are the more widely used measures.

$$NNI = GNI - \text{depreciation}$$

### Nominal GDP and real GDP

If we were to compare the GDP of a country from one year to another we would have to take into account the fact that prices in the economy are likely to have risen. If prices of goods and services rise (inflation) then this will overstate the value of GDP. That is, GDP will rise, even if there hasn't actually been an increase in economic activity. In order to get a true picture of the change in economic activity we take the nominal GDP, which is the value at current prices, and adjust it for inflation to get the GDP at constant prices. This is done through the use of a "GDP deflator" and the value is known as real GDP. To compare GDP data over time it is necessary to use the real value so that price changes cannot distort the information.

$$\text{Real GDP} = \text{Nominal GDP adjusted for inflation}$$

Although a number of countries and international economic bodies still use the term GNP, the World Bank and many other countries and institutions are now using the term GNI. This is in line with the 1993 United Nations System of National Accounts (UNSNA). The aim of the UNSNA is to encourage countries to adopt a standard format and terminology for their national accounting systems in order to make it easier to make comparisons between nations.

Adoption of the UNSNA is encouraged but is not compulsory and a number of countries, such as France and the USA, have notably different terminology, although sufficient data is supplied to express their figures in the UNSNA style.

In light of this, for the rest of this chapter we will use the term GNI to represent what was GNP.

Whenever you see the adjective "real" in front of an economic variable, it means that the variable has been adjusted for inflation. This makes it possible to compare data over time.



**Assessment advice**

In HL paper 3 you may be asked to calculate real GDP using a price deflator.

Here is an example of the kind of question that you may face and a worked solution:

The nominal GDP for country X in 2009 was US\$750 billion and in 2010 it rose to US\$780 billion. In the year in question country X had experienced an inflation rate of 4%.

- 1 Calculate the real GDP figure for 2010 for country X.
- 2 Explain why the real GDP figure for 2010 is not the same as the nominal figure.

Solution:

- 1 Real GDP for 2010 = 780 billion  $\times$  price deflator\* =  
780 billion  $\times \frac{100}{104}$  = 750 billion

[\*A GDP price deflator is calculated by the following equation:  
 $\frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$ . It actually gives a good indication of inflation in the economy over the period in question. If you wish to work out the price deflator then you need to have both the nominal and real values for GDP.

If you are given the inflation rate and the nominal rate, as in the question above, then the price deflator is easy to calculate. The deflator is a fraction and is simply  $\frac{100}{100 + \text{the inflation rate}}$ . The fraction is multiplied by the nominal figure to give a real figure.]

- 2 Because there was inflation of 4% in the year the prices of everything in the economy, on average, went up by 4%. This means that the value of the goods and services produced in the economy in the year would have been 4% greater than the previous year. Interestingly, when the inflationary effect is taken out, the real GDP figure for 2010 is the same as the figure for 2009. This means that the economy produced the same value of goods and services in both years. The level of economic growth was 0%.

**GDP per capita**

This is the easiest of the national income statistics to measure. It is simply the total GDP divided by the size of the population. While the total economic activity of a country is appropriately measured using the GDP figure, if one is to make any judgment about the progress of a country in comparison with other countries in terms of raising living standards then the GDP per capita figure is much more appropriate.

For example, the GDP of China is US\$ 5,365 billion, significantly higher than that of Canada, with a GDP of US\$ 1,556 billion. This says that the output of China is approximately three and a half times larger than that of Canada. However, when we take the population into account we find that China's GDP per capita is US\$ 3,678, while the GDP per capita of Canada is US\$ 45,658. Thus the output per person in Canada is almost twelve and a half times that of China's output per person.

Source: IMF World Economic Outlook Database, April 2010

**Student workpoint 13.2****Be an inquirer**

Pick an OECD country that you can study throughout the macroeconomics part of the course. The student workpoints will allow you to build a good case study of this country. There are several resources that you can use to do the research—the national statistics office for the country and the OECD ([www.oecd.org](http://www.oecd.org)) are two good starting points.

For this first exercise find the following information and put it into a table. Be sure to note the source.

- 1 Real GDP for the last 10 years.
- 2 Real GDP per capita for the last 10 years.
- 3 Real GDP growth per year for the last 10 years.

**Why are national income statistics gathered?**

Definitions of national income are fairly straightforward, but the job of compiling accurate accounts is extremely complicated and necessarily expensive. Every country has an organisation that is responsible for calculating and reporting on the country's national accounts. The United Nations provides guidelines for such work in the System of National Accounts (SNA). The data gathered are used in myriad ways.

- National income statistics can be seen as a "report card" for a country. Economic growth is a stated objective of governments. Economic growth is an increase in a country's national income over time. Therefore, people use the statistics to judge whether or not a government has been successful in achieving its macroeconomic objective of increased growth.
- Governments use the statistics to develop policies.
- Economists use the statistics to develop models of the economy and make forecasts about the future.
- Businesses use statistics to make forecasts about future demand.
- The performance of an economy over time can be analysed (as long as real data are used).
- Because rising national income is often equated with rising living standards, people often use national income accounts as a basis for evaluating the standard of living or quality of life of a country's population.
- National income statistics are often used as a basis for comparing different countries.

**Limitations of the data**

Given the importance of national income statistics and their wide use, it is important to be aware of possible limitations of the data, both in terms of the accuracy of the data, in terms of their uses for making comparisons, and in terms of their appropriateness in making conclusions about living standards.

- *Inaccuracies:* As noted above, the data that are used to calculate the various measures of national income come from a vastly wide range of sources, including tax claims by households and firms, output data, and sales data. Figures tend to become more accurate after a lag time as they are revised when additional data are included.